

Development Statuses and Prospects of Rotary Modulation Optical Inertial Navigation

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Abstract

In modern warfare, resisting enemy electronic interference is crucial to victory. How to ensure that all kinds of weapons can hit far and accurately under strong electromagnetic interference, and put forward higher requirements for inertial navigation (INS): On one hand, there is a requirement for higher precision in INS, and on the other, a demand for reduced size and cost, enabling widespread and affordable use across various types of weapons. As the current mainstream autonomous navigation method for various weapons, optical inertial navigation systems must achieve order-of-magnitude improvements in precision while being developed under stringent size and cost constraints. This is a critical consideration in weapons development. This paper introduces the concept of rotary modulation inertial navigation for missiles, addresses the key challenges to be resolved, and discusses its implications for the advancement of weapon technology.



Xin Zheng, Deputy Director of the Scientific and Technological Committee at China Aerospace Science and Industry Corporation (CASIC), serves as the Chief Scientist of the Group and holds a Ph.D. in Engineering. He is the leader of a professional group in specific national industry. With extensive experience in research and engineering practice in inertial navigation technology, he has held key positions as a technical lead for several major inertial navigation models and as a Chief Scientist of the 973 Program.

Xin Zheng has overseen the development and large-scale application of multiple optical inertial navigation systems in China, significantly contributing to national security, development interests, and the advancement of the inertial navigation industry. He has received six National Science and Technology Progress Awards, including one Special Prize, one First Prize, and four Second Prizes. Additionally, he has been selected for the "511 Talent Project" and the "Ten Thousand Talents Program," and has been honored with various accolades such as the "State Council Government Special Allowance," the "National Innovation Excellence Award," and the "Qian Xuesen Outstanding Contribution Award."